



Dart Hawkesbury  
1270 Aberdeen St Hawkesbury, ON K6A 1K7 Canada  
Tel (613) 632-5200  
Fax 613 632-5246

## Purchasing Receipts

PO No	Supplier	Line No	Rel No	Terms	Purchased Item	Description	For Part No	Project	Equipment ID	Order Qty	Due Date	Received Quantity	Accounting Job No	Container No	Status	Receive Date	Price/Unit	Aging Days	Past Due	Total	Supplier Name
P0042020	MCM001-VU	1		1 2% 10 Net 30	188-FSCS-1032-1-1/4	Screw				50	12/20/2018	50		S142223	Stock	1/7/2019	\$ 0.17 / Ea	0		\$8.57	McMaster-Carr Supply Co.
		2			2044T47	Tube Ø1.09				20		20		S142226	Stock	1/7/2019	\$ 0.61 / ft	0		\$12.10	McMaster-Carr Supply Co.
		3			30806	8 Wire				25		25		S142193	Stock	1/7/2019	\$ 3.02 / ft	0		\$75.50	McMaster-Carr Supply Co.
		4			3755T17	Lifting Oval Sleeve receive ea				10		10		S142196	Stock	1/7/2019	\$ 4.07 / Ea	0		\$40.65	McMaster-Carr Supply Co.
		5			5/16-18 SS THREADED	Threaded Rod receive f				6		6		S142230	Stock	1/7/2019	\$ 1.71 / ft	0		\$10.24	McMaster-Carr Supply Co.
		6			5274T761	Polypropylene Vial for Flange Wrench Bolts receive ea				10		10		S142197	Stock	1/7/2019	\$ 1.74 / Ea	0		\$17.44	McMaster-Carr Supply Co.
		7			5972K289	Bearing				4		4		S142224	Stock	1/7/2019	\$ 10.42 / Ea	0		\$41.68	McMaster-Carr Supply Co.
		8			601.2045	RTV (LOCTITE 598) : RTV, Loctite 598				16		16		S142190	Stock	1/7/2019	\$ 14.36 / Ea	0		\$229.76	McMaster-Carr Supply Co.
		9			6264K85	Chain receive pcs				50		50		S142162	Inactive	1/7/2019	\$ 14.98 / ft	0		\$749.00	McMaster-Carr Supply Co.
		10			6605K56	Hook And Loop Tie D3551-11				20		20		S142188	Inactive	1/7/2019	\$ 3.09 / pcs	0		\$61.80	McMaster-Carr Supply Co.
		11			7856K74	Heat Shrink Tubing, Ø19" ID Before, 25' Long receive pcs				25		25		S142191	Stock	1/7/2019	\$ 0.62 / Ea	0		\$15.56	McMaster-Carr Supply Co.

PO No	Supplier	Line Item No	Rel No	Terms	Purchased Item	Description	For Part No	Project	Equipment ID	Order Qty	Due Date	Received Quantity	Accounting Job No	Container No	Status	Receive Date	Price/Unit	Aging Days	Past Due	Total	Supplier Name
		12			8574K53	Clear Polycarbonate Sheet, 24" x 24" x 1/8"				2		2		S142232	Stock	1/7/2019	\$ 12.76 / sf	0		\$25.52	McMaster-Carr Supply Co.
		13			90145A439	Dowel Pin receive pcs				50		50		S142213	Stock	1/7/2019	\$ 0.15 / Ea	0		\$7.57	McMaster-Carr Supply Co.
		14			90145A443	Dowel Pin						50		S139527	Stock	12/20/2018	\$ 0.21 / Ea	18		\$10.62	McMaster-Carr Supply Co.
		15			90576A118	Cage Bumper Nut, same as C10-35						50		S142212	Stock	1/7/2019	\$ 0.18 / pcs	0		\$9.14	McMaster-Carr Supply Co.
		16			91268A967	Lifting Bolt				10		10		S142234	Stock	1/7/2019	\$ 46.13 / Ea	0		\$461.30	McMaster-Carr Supply Co.
		17			91257A758	Bolt Grade 8 Steel, 1/2"-20 Thread, 5-1/2" Long Partially Threaded				4		4		S142220	Stock	1/7/2019	\$ 3.00 / Ea	0		\$12.00	McMaster-Carr Supply Co.
		18			92185A564	Screw 1/4-28 Unf				10		10		S142218	Stock	1/7/2019	\$ 0.73 / Ea	0		\$7.30	McMaster-Carr Supply Co.
		19			92196A139	SCREW 6-32 x 1/8" SS				25		25		S142210	Stock	1/7/2019	\$ 0.33 / Ea	0		\$8.14	McMaster-Carr Supply Co.
		20			93475A280	Washer				51		51		S142207	Stock	1/7/2019	\$ 0.12 / Ea	0		\$6.22	McMaster-Carr Supply Co.
		21			94748A429	SS Knob-Grip Push-Button Quick Release Pin 3/8" Dia. x 2-1/2" Long				5		5		S142199	Stock	1/7/2019	\$ 39.70 / Ea	0		\$198.50	McMaster-Carr Supply Co.
		22			MT-O1-B-0.375X0.500	Tool Steel Bar 0.375" X 0.500"				6		6		S142236	Stock	1/7/2019	\$ 13.23 / ft	0		\$79.36	McMaster-Carr Supply Co.
		23			97395A451	Dowel Pin receive ea				40		40		S142204	Stock	1/7/2019	\$ 0.85 / Ea	0		\$34.12	McMaster-Carr Supply Co.
		24			97395A491					10		10		S142219	Stock	1/7/2019	\$ 1.38 / Ea	0		\$13.79	McMaster-Carr

PO No	Supplier	Line Item No	Rel No	Terms	Purchased Item	Description	For Part No	Project	Equipment ID	Order Qty	Due Date	Received Quantity	Accounting Job No	Container No	Status	Receive Date	Price/Unit	Aging Days	Past Due	Total	Supplier Name
						SS Dowel Pin 1/4" Dia x 1" Lg.															Supply Co.
		25			97526A421	Rivet receive ea				100		100		S142208	Stock	1/7/2019	\$ 0.19 / Ea	0		\$18.72	McMaster-Carr Supply Co.
		26			97633A475	External Retaining Ring for 2-7/8" OD.				5		5		S139532	Stock	12/20/2018	\$ 1.85 / Ea	18		\$9.24	McMaster-Carr Supply Co.
		27			9776K33	Hook And Loop Strip 1" D3800-3-100				75		75		S142173	Inactive	1/7/2019	\$ 1.21 / ft	0		\$90.59	McMaster-Carr Supply Co.
		28			98381A544	Dowel Pin, Large Ø 1/4 X 1-1/4				25		25		S139511	Stock	12/20/2018	\$ 0.28 / Ea	18		\$7.09	McMaster-Carr Supply Co.
		29			98381A657	Dowel Pin				10		10		S142206	Stock	1/7/2019	\$ 1.82 / Ea	0		\$18.16	McMaster-Carr Supply Co.
		30			98758A516	Steel Thread Rod 1/2"-13 x 3-1/2" Long receive ea				6		6		S142200	Stock	1/7/2019	\$ 2.33 / Ea	0		\$13.98	McMaster-Carr Supply Co.
		31			MC1095S 020	C1095 Blue Tempered Spring Steel Sheet .020 : MCMaster P/N: 9036K499 X 1 PK MIL-B-5687D BLUE FINISHED AND POLISHED 1095 SPRING STEEL .020 6" X 20' COIL receive sf				10		10		S142237	Stock	1/7/2019	\$ 7.61 / sf	0		\$76.08	McMaster-Carr Supply Co.
		32			MDELINR0.375	M Delrin Round Bar, Black				5		5		S142238	Stock	1/7/2019	\$ 0.74 / ft	0		\$3.70	McMaster-Carr Supply Co.
		33			MT-01-B-0.500X12.000	AISI 01 TOOL STEEL BAR 0.500" High X 12.000" Wide				3		3		S142239	Stock	1/7/2019	\$ 145.66 / ft	0		\$436.97	McMaster-Carr Supply Co.
		34			MT-01-R0.375	Tool Steel Round Bar 0.375 dia.				6		6		S142240	Stock	1/7/2019	\$ 2.59 / ft	0		\$15.56	McMaster-Carr





Dart Aerospace Ltd.  
1270 Aberdeen St  
Hawkesbury, ON  
K6A 1K7  
Canada

Tel (613) 632-5200

# **PURCHASE ORDER** **PO042020**

**Supplier:** MCM001-VU  
McMaster-Carr Supply Co,  
P.O. Box 7690  
Chicago, IL 60680-7690 USA  
Phone: 330 995 5500  
Fax: 330 995 9600

**PO No:** PO042020

**PO Date:** 12/17/18

**Due Date:** 12/20/18

**Purchase Order**

**Revision:**

**Revision Date:**

**Ship-To Contact:** Lavoie, Chantal  
clavoie@dartaero.com

**Ship To:** 1270 Aberdeen Street  
Hawkesbury  
ON  
K6A 1K7 Canada  
Phone: 613-632-5200

**Via:** Ground

**Pymt Terms:** 2% 10 Net 30

**Freight Terms:**

**Special Comments:**

**E-MAILED**  
**DEC 17 2018**

## **Items**

Line Item	Job	Part	Supplier Part No	Description	Status	Account	Due Date	Order Quantity	Received Quantity	Balance	Unit Price (CAD)	Extended Price
1		188-FSCS-1032-1-1/4	92196A276	Screw	Firmed	-	12/20/18	50 Ea	0 Ea	50 Ea	\$0.1714/Ea	\$8.57
2		2044T47	4 ft long	Tube Ø1.09	Firmed	-	12/20/18	20 ft	0 ft	20 ft	\$0.605/ft	\$12.10
Line Item Note: 5 pcs of 4 ft												
3		30806	7081K38	8 Wire	Firmed	-	12/20/18	25 ft	0 ft	25 ft	\$3.02/ft	\$75.50
4		3755T17	2/pk	Lifting Oval Sleeve receive ea	Firmed	-	12/20/18	10 Ea	0 Ea	10 Ea	\$4.065/Ea	\$40.65
5		5/16-18 SS THREADED	98847A030	Threaded Rod	Firmed	-	12/20/18	6 ft	0 ft	6 ft	\$1.706666/ft	\$10.24
6		5274T761	5/pk	Polypropylene Vial for Flange Wrench Bolts receive ea	Firmed	-	12/20/18	10 Ea	0 Ea	10 Ea	\$1.744/Ea	\$17.44
7		5972K289		Bearing	Firmed	-	12/20/18	4 Ea	0 Ea	4 Ea	\$10.42/Ea	\$41.68
8		601.2045	6641A41	RTV (LOCTITE 598) : RTV, Loctite 598	Firmed	-	12/20/18	16 Ea	0 Ea	16 Ea	\$14.36/Ea	\$229.76
9	187765	6264k85		Chain	Firmed	-	12/20/18	50 ft	0 ft	50 ft	\$14.98/ft	\$749.00
Line Item Note: AS PER DWG D5039 REV. B												
10	187766	6605K56	5/pk	Hook And Loop Tie D3551-11	Firmed	-	12/20/18	20 pcs	0 pcs	20 pcs	\$3.09/pcs	\$61.80
Line Item Note: AS PER DWG D3551 REV.A												



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# **PURCHASE ORDER** **PO042020**

## **Items**

Line Item	Job	Part	Supplier Part No	Description	Status	Account	Due Date	Order Quantity	Received Quantity	Balance	Unit Price (CAD)	Extended Price
11		7856K74	25 ft	Heat Shrink Tubing, Ø19" ID Before, 25' Long receive pcs	Firmed	-	12/20/18	25 Ea	0 Ea	25 Ea	\$0.6224/Ea	\$15.56
12		8574K53	2 sf per pcs	Clear Polycarbonate Sheet, 24" x 24" x 1/8"	Firmed	-	12/20/18	2 sf	0 sf	2 sf	\$12.76/sf	\$25.52
13		90145A439	50/pk	Dowel Pin receive pcs	Firmed	-	12/20/18	50 Ea	0 Ea	50 Ea	\$0.1514/Ea	\$7.57
14		90145A443	50/pk	Dowel Pin	Firmed	-	12/20/18	50 Ea	0 Ea	50 Ea	\$0.2124/Ea	\$10.62
15		90576A118	50/pk	Cage Bumper Nut : same as C10-35	Firmed	-	12/20/18	50 pcs	0 pcs	50 pcs	\$0.1828/pcs	\$9.14
16		91268A967	1/pk	Lifting Bolt	Firmed	-	12/20/18	10 Ea	0 Ea	10 Ea	\$46.13/Ea	\$461.30
17		91257A758	1/pack	Bolt Grade 8 Steel, 1/2"-20 Thread, 5-1/2" Long Partially Threaded	Firmed	-	12/20/18	4 Ea	0 Ea	4 Ea	\$3.00/Ea	\$12.00
18		92185A564	10/pk	Screw 1/4-28 Unf	Firmed	-	12/20/18	10 Ea	0 Ea	10 Ea	\$0.73/Ea	\$7.30
19		92196A139	25/pk	SCREW 6-32 x 1/8" SS	Firmed	-	12/20/18	25 Ea	0 Ea	25 Ea	\$0.3256/Ea	\$8.14
20		93475A280	50/pk	Washer	Firmed	-	12/20/18	50 Ea	0 Ea	50 Ea	\$0.122/Ea	\$6.10
21		94748A429	1/pk	SS Knob-Grip Push-Button Quick Release Pin 3/8" Dia. x 2-1/2" Long	Firmed	-	12/20/18	5 Ea	0 Ea	5 Ea	\$39.70/Ea	\$198.50
22		MT-O1-B-0.375X0.500	9516K101 6 ft	Tool Steel Bar 0.375" X 0.500"	Firmed	-	12/20/18	6 ft	0 ft	6 ft	\$13.22666/ft	\$79.36
23		97395A451	10/pk	Dowel Pin receive ea	Firmed	-	12/20/18	40 Ea	0 Ea	40 Ea	\$0.853/Ea	\$34.12
24		97395A491	10/pk	SS Dowel Pin 1/4" Dia. x 1" Lg.	Firmed	-	12/20/18	10 Ea	0 Ea	10 Ea	\$1.379/Ea	\$13.79
25		97526A421	97526A160 100/pk	Rivet receive ea	Firmed	-	12/20/18	100 Ea	0 Ea	100 Ea	\$0.1872/Ea	\$18.72





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# **PURCHASE ORDER** **PO042020**

## **Items**

Line Item	Job	Part	Supplier Part No	Description	Status	Account	Due Date	Order Quantity	Received Quantity	Balance	Unit Price (CAD)	Extended Price
26		97633A475	5/pk	External Retaining Ring for 2-7/8" OD.	Firmed	-	12/20/18	5 Ea	0 Ea	5 Ea	\$1.848/Ea	\$9.24
27	187769	9776K33	75 ft roll	Hook And Loop Strip 1" D3800-3-100	Firmed	-	12/20/18	75 ft	0 ft	75 ft	\$1.2078666/ft	\$90.59
Line Item Note: AS PER DWG D3800 REV. B												
28		98381A544	25/pk	Dowel Pin, Large Ø 1/4 X 1-1/4	Firmed	-	12/20/18	25 Ea	0 Ea	25 Ea	\$0.2836/Ea	\$7.09
29		98381A667	5/pk	Dowel Pin	Firmed	-	12/20/18	10 Ea	0 Ea	10 Ea	\$1.816/Ea	\$18.16
30		98758A516	1/pk	Steel Thread Rod 1/2"-13 x 3-1/2" Long receive ea	Firmed	-	12/20/18	6 Ea	0 Ea	6 Ea	\$2.33/Ea	\$13.98
31		MC1095S.020	9036K499	C1095 Blue Tempered Spring Steel Sheet .020 : MCMaster P/N: 9036K499 X 1 PK MIL-B-5687D BLUE FINISHED AND POLISHED 1095 SPRING STEEL .020 6" X 20' COIL receive sf	Firmed	-	12/20/18	10 sf	0 sf	10 sf	\$7.6075/sf	\$76.08
Line Item Note: 1 P[CS OF 6" X 20 FT = 10 SF												
32		MDELINR0.375	8576K13 5 ft	M Delrin Round Bar, Black	Firmed	-	12/20/18	5 ft	0 ft	5 ft	\$0.74/ft	\$3.70
33		MT-O1-B-0.500X12.000	9516K527 3 FT	AISI.01 TOOL STEEL BAR 0.500" High X 12.000" Wide	Firmed	-	12/20/18	3 ft	0 ft	3 ft	\$145.65666/ft	\$436.97
34		MT-O1-R0.375	8893K239 6 ft	Tool Steel Round Bar 0.375 dia.	Firmed	-	12/20/18	6 ft	0 ft	6 ft	\$2.593333/ft	\$15.56
35		MT-O1-R0.625	8893K9 6 FT	Tool Steel Round Bar 0.625 dia.	Firmed	-	12/20/18	6 ft	0 ft	6 ft	\$5.1366666/ft	\$30.82
<b>Grand Total:</b>											<b>\$2,856.66</b>	



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1270 Aberdeen St  
Hawkesbury, ON  
K6A 1K7  
Canada

Tel (613) 632-5200

## PURCHASE ORDER PO042020

### Order Notes

Procurement Quality Clauses  
A005 RIGHT OF ENTRY  
A016 PERSONNEL QUALIFICATION  
A026 CERTIFICATION OF MATERIAL CONFORMANCE  
A032 DOCUMENT SPECIAL REQUIREMENTS  
A033 STATEMENT OF CONFORMITY/TEST RECORDS FOR NAS, AN and MS FASTENERS  
A040 NOTIFICATION OF QUALITY ESCAPE  
A041 QUALITY MANAGEMENT SYSTEM  
A042 DART NOTIFICATION BY SUPPLIER  
A043 RETENTION OF QUALITY DOCUMENTS  
  
A048 COUNTERFEIT PARTS AVOIDANCE, DETECTION, MITIGATION AND DISPOSITION PROGRAM  
  
A049 SUPPLIER AWARENESS

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Terms & Condition of Purchasing(Suppliers) and Procurement Quality Clauses are an integral part of our AS9100 requirements. To learn in detail, please visit [www.dartaerospace.com](http://www.dartaerospace.com) for further explanation.

Plex 12/17/18 8:53 AM dart.lavoie.chantal



200 Aurora Industrial Pkwy  
Aurora OH 44202-8087  
330-995-5500  
cle.sales@mcmaster.com

Dart Aerospace Ltd  
1270 Aberdeen St  
Hawkesbury ON K6A 1K7  
Canada

Purchase Order  
**PO042020**

Order Placed By  
**Chantal Lavoie**

McMaster-Carr Number  
**5473390-02**

Page 1 of 2

12/17/2018

# Packing Lis

Line	Product	Ordered	Shipped
1	<del>92196A276</del> 18-8 Stainless Steel Socket Head Screw, 10-32 Thread Size, 1-1/4" Long, Partially Threaded, Packs of 50	1 Pack	1 ✓
2	<del>2044T47</del> Round Cut-to-Length Shipping Tube, 1.09" ID, 48" Inside Length	5 Each	5 ✓
3	<del>7081K38</del> Cable, SOOW, Black Outer Insulation, 16 Gauge, 8 Wires, 25' Long	25 Feet	25 ✓
4	<del>3755T17</del> Wire Rope Compression Sleeve - for Lifting for Stainless Steel and Steel Rope, 18-8 Stainless Steel, for 3/16" Rope Diameter, Packs of 2	5 Packs	5 ✓
5	<del>98847A030</del> 18-8 Stainless Steel Threaded Rod, 5/16"-18 Thread Size, 3 Feet Long, Packs of 1	2 Packs	2 ✓
6	<del>5274T761</del> Polypropylene Plastic Vials with Tight Fitting Lid, 1.9 oz./55 ml Capacity, Packs of 5	2 Packs	2 ✓
7	<del>5972K289</del> Ball Bearing, Sealed, Trade No. 6903-2RS, for 17 mm Shaft Diameter	4 Each	4 ✓
8	<del>6641A41</del> Flexible Gasket Maker Sealant, Loctite 598, 2.36 oz. Tube	16 Each	16 ✓
9	<del>6264K85</del> Single Strand Corrosion-Resistant Roller Chain, ANSI Number 40-SS, 1/2" Pitch, 50 Feet Long	1 Each	1 ✓
10	<del>6605K56</del> Hook and Loop Cable Ties, 24" Overall Length, Meets UL 94V2, Packs of 5	4 Packs	4 ✓
11	<del>7856K74</del> Heat-Shrink Tubing, 25 Feet Long, 0.19" ID Before Shrinking, Black	1 Each	1 ✓
12	<del>8574K53</del> Clear Polycarbonate Sheet, 24" x 24" x 1/8"	1 Each	1 ✓
13	<del>90145A439</del> 18-8 Stainless Steel Dowel Pin, 3/32" Diameter, 9/16" Long, Packs of 50	1 Pack	1 <i>3 extra</i>
14	<del>90145A443</del> 18-8 Stainless Steel Dowel Pin, 3/32" Diameter, 1" Long, Packs of 50	1 Pack	1 ✓
15	<del>90576A118</del> Medium-Strength Steel Nylon-Insert Locknut, Class 8, Zinc-Plated, M10 x 1.5 mm Thread, Packs of 50	1 Pack	1 ✓
16	<del>91268A967</del> High-Strength Grade 8 Steel Hex Head Screw, 1-1/2"-6 Thread Size, 12" Long, Packs of 1	10 Packs	10 ✓
17	<del>91257A758</del> Zinc Yellow-Chromate Plated Hex Head Screw, Grade 8 Steel, 1/2"-20 Thread, 5-1/2" Long, Partially Threaded, Packs of 1	4 Packs	4 ✓
18	<del>92185A564</del> Super-Corrosion-Resistant 316 Stainless Steel Socket Head Screw, 1/4"-28 Thread Size, 1" Long, Packs of 10	1 Pack	1 ✓
19	<del>92196A139</del> 18-8 Stainless Steel Socket Head Screw, 6-32 Thread Size, 1/8" Long, Packs of 25	1 Pack	1 ✓

# Packing List

200 Aurora Industrial Pkwy  
Aurora OH 44202-8087  
330-995-5500  
cle.sales@mcmaster.com

Dart Aerospace Ltd  
1270 Aberdeen St  
Hawkesbury ON K6A 1K7  
Canada

Purchase Order  
**PO042020**

Order Placed By  
**Chantal Lavoie**

McMaster-Carr Number  
**5473390-02**

Page 2 of 2

12/17/2018

Line	Product	Ordered	Shipped
20	<b>93475A280</b> 18-8 Stainless Steel Washer for M10 Screw Size, 10.5 mm ID, 20 mm OD, Packs of 50	51 1 Pack	1 ✓ <i>extra</i>
21	<b>94748A429</b> Knob-Grip Push-Button Quick-Release Pin with Lanyard, 3/8" Diameter, 2-1/2" Usable Length	5 Each	5 ✓
22	<b>9516K101</b> Tight-Tolerance Multipurpose O1 Tool Steel Bar, 3/8" Thick, 1/2" Wide, 6 Feet Long	1 Each	1 ✓
23	<b>97395A451</b> Dowel Pin, 316 Stainless Steel, 1/8" Diameter, 3/4" Long, Packs of 10	4 Packs	4 ✓
24	<b>97395A491</b> Dowel Pin, 316 Stainless Steel, 1/4" Diameter, 1" Long, Packs of 10	1 Pack	1 ✓
25	<b>97526A421</b> Domed Head Blind Rivets, 3/16" Diameter, for 0.3760"-0.5" Material Thickness, Black, Packs of 100	1 Pack	1 ✓ <i>miss</i>
26	<b>97633A475</b> External Retaining Ring for 2-7/8" OD, Black-Phosphate 1060-1090 Spring Steel, Packs of 5	1 Pack	1 ✓
27	<b>9776K33</b> Flame-Retardant Hook, 1" Wide x 75 Feet Long	1 Each	1 ✓
29	<b>98381A667</b> Dowel Pin, Alloy Steel, 7/16" Diameter, 3/4" Long, Packs of 5	2 Packs	2 ✓
30	<b>98758A516</b> Medium-Strength Threaded Rod, Grade B7 Black-Oxide Steel, 1/2"-13 Thread Size, 3-1/2" Long	6 Each	6 ✓
31	<b>9036K499</b> Wear-Resistant 1095 Spring Steel, 0.0200" Thick, 6" Wide, 20 Feet Long	1 Each	1 ✓
32	<b>8576K13</b> Black Delrin® Acetal Resin Rod, 3/8" Diameter, 5 Feet Long	5 Feet	5 ✓
33	<b>9516K527</b> Tight-Tolerance Multipurpose O1 Tool Steel Bar, 1/2" Thick, 12" Wide, 3 Feet Long	1 Each	1 ✓
34	<b>8893K239</b> Tight-Tolerance Multipurpose O1 Tool Steel Rod, 0.3750" Diameter, 6 Feet Long	1 Each	1 ✓
35	<b>8893K9</b> Tight-Tolerance Multipurpose O1 Tool Steel Rod, 0.6250" Diameter, 6 Feet Long	1 Each	1 ✓

Shipped separately from our Chicago warehouse on 12/17

28	<b>98381A544</b> Dowel Pin, Alloy Steel, 1/4" Diameter, 1-1/4" Long	1 Pack	1
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# McMASTER-CARR®

## Tight-Tolerance Multipurpose O1 Tool Steel Bar 3/8" Thick, 1/2" Wide

9516K101



Material	O1 Tool Steel
Cross Section Shape	Rectangle
Construction	Solid
Appearance	Plain
Thickness	3/8"
Thickness Tolerance	-0.001" to 0.001"
Tolerance Rating	Tight
Width	1/2"
Width Tolerance	0" to 0.005"
Yield Strength	50,000 psi
Temper Rating	Not Rated
Hardness	Rockwell B85
Hardness Rating	Medium
Heat Treatable	Yes
Maximum Hardness after Heat Treatment	Rockwell C65
Mechanical Finish	Precision Ground
Temperature Range	Not Rated
Specifications Met	ASTM A681
Flatness Tolerance	Not Rated
Density	0.28 lbs./cu. in.
Coefficient of Thermal Expansion	$7.1 \times 10^{-6}$
Elongation	25%
Material Composition	
Iron	94.79-96.95%
Carbon	0.85-1.05%
Chromium	0.40-0.70%

Manganese	1.00-1.40%
Nitrogen	0.40-0.60%
Phosphorus	0-0.030%
Silicon	0-0.50%
Sulfur	0-0.030%
Tungsten	0.40-0.60%
Vanadium	0-0.30%
Length	1 1/2 ft., 3 ft., 6 ft.
Additional Specifications	Guidelines for Heat Treating Tool Steel


These precision-ground sheets and bars have a tight thickness tolerance of  $\pm 0.001"$  ( $\pm 0.05$  mm). Commonly used for dies, punches, and gauges, O1 tool steel is an oil-hardening material that resists wear and abrasion. Sheets and bars are also known as flat stock.

8	7	6	5	4	3	2	1
---	---	---	---	---	---	---	---

SPECIFICATION:  
DIN 1.2510 or B.S. BO 1 or  
SAE J437 or SAE J438  
or UNS T31501 or ASTM A61

EG. 4"x6" BAR = MT-Q1-B-4,000x6,000

TOLERANCES PER MANUFACTURER SPECIFICATIONS

1114	 DART AEROSPACE Industrial Drive Canada	MT-O1-B (see also)	11/1 1/1	DIMENSION: 1/1 1/1	1/1 1/1	1/1 1/1
				DIMENSION: 1/1 1/1	1/1 1/1	1/1 1/1
AISI O1 TOOL STEEL BAR				1/1 1/1		

## MATERIAL RECEIPT INSPECTION FORM

MATERIAL: MT-01-B-0.375x0.500

PO / BATCH NO.: P0042020/S142236

DATE: 11/01/07

MATERIAL CERT REC'D: Yes  
 QUANTITY RECEIVED: 64  
 QUANTITY INSPECTED: 64  
 QUANTITY REJECTED: 0

THICKNESS ORDERED: 0.375"  
 THICKNESS RECEIVED: 0.375"  
 SHEET SIZE ORDERED: —  
 SHEET SIZE RECEIVED: —

DESCRIPTION	NCR (Check Y/N)	COMMENTS
SURFACE DAMAGE	Y <input checked="" type="checkbox"/>	
CORRECT FINISH	<input checked="" type="checkbox"/> N	
CORROSION	Y <input checked="" type="checkbox"/>	
CORRECT GRAIN DIRECTION	<input checked="" type="checkbox"/> N	
CORRECT MATERIAL PER M-DRAWING	<input checked="" type="checkbox"/> N	<u>ASTM A681</u>
CORRECT THICKNESS	<input checked="" type="checkbox"/> N	
PHOTO REQUIRED	Y <input checked="" type="checkbox"/>	
CORRECT REF # TO LINK CERT	<input checked="" type="checkbox"/> N	<u>P0042020</u>
CORRECT MATERIAL IDENTIFICATION	<input checked="" type="checkbox"/> N	
CORRECT M# ON THE MATERIAL	<input checked="" type="checkbox"/> N	
DOES THIS MATERIAL REQUIRE ENGINEERING SIGN OFF	Y <input checked="" type="checkbox"/>	
DOES THIS REQUIRE AN EXTRUSION REPORT	Y <input checked="" type="checkbox"/>	

CUT SAMPLE PIECE OF MATERIAL AND PREFORM A HARDNESS CHECK. RECORD RESULTS BELOW					
	HRC	HRB	DUR A	DUR D	WEBSTER
TYPE OF MATERIAL					
SIZE OF TEST SAMPLE					
HARDNESS / DUROMETER READING					

testers located in the Quality Office

QC 18 INSPECTION	ENGINEERING SIGNOFF (if required)
INSPECTED BY: <u>61</u> <u>9-89</u>	SIGNED OFF BY: _____
DATE: <u>11/01/07</u>	DATE: _____

Attach this inspection sheet with the corresponding material cert and remit to be scanned and received in





Black Delrin® Acetal Resin Rod  
3/8" Diameter, 5 Feet Long



\$0.74 per ft. of 5  
8576K13

Material	Delrin® Acetal Plastic
Cross Section Shape	Round
Construction	Solid
Texture	Smooth
Color	Black
Clarity	Opaque
Diameter	3/8"
Diameter Tolerance	0" to +0.005"
Tolerance Rating	Oversized
Length	5 ft.
Hardness	Rockwell M90
Hardness Rating	Hard
For Use Outdoors	No
Temperature Range	-20° to 180° F
Impact Strength	1.00 ft.-lbs./in.
Impact Strength Rating	Good
Tensile Strength	9,000 psi
Tensile Strength Rating	Good
Specifications Met	ASTM D6100
Density	0.051 lbs./cu. in.
Coefficient of Friction	0.20
Dielectric Strength	435 V/mil
Water Absorption	0.30%
Coefficient of Thermal Expansion	8.5 × 10 <sup>-5</sup> in./in./°F
RoHS	Compliant

# SPECIFICATION CONTROL DRAWING

PURCHASE MATERIAL DELRIN II 150E OR ACETRON GP ACETAL

PART NUMBER: M-DELIN-R.D.DDD | X | COLOR |  |  
DIA | CODE

WHERE D.DDD = DIAMETER IN INCHES  
 X = COLOR CODE, "W" = WHITE, OMITTED = BLACK  
EG. 1" BLACK ROUND BAR = M-DELIN-R1.000  
2" WHITE ROUND BAR = M-DELIN-R2.000W

B	UPDATE DRAWING TO CURRENT STANDARDS ADD MATERIAL COLOR "WHITE" ADD REASON CUS-116: ADD "ACETRON GP ACETAL" AS OPTION (REV. A1).	SAD	17.10.19
A	NEW ISSUE	DS	01.11.12
REV.	DESCRIPTION	BY	DATE
DESIGN	SAD		
DRAWN	SAD		
CHECKED	RF		
MFG. APPR.	RA		
APPROVED	HS		
DE APPR.	CP 47		
DATE	17.10.19		

**DART AEROSPACE LTD**  
HAWKESBURY, ONTARIO, CANADA  
REV. B  
DRAWING NO. M-DELIN-R  
SHEET 1 OF 1  
SCALE NTS  
DELIN ROUND BAR  
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RELEASED  
2019 MAR 27 4  
ECJ 18-657

APPROVED

## MATERIAL RECEIPT INSPECTION FORM

MATERIAL: MDLRINR 0.375  
 DATE: 19/01/07

PO / BATCH NO.: P0042020 / 5142238

MATERIAL CERT REC'D: Yes  
 QUANTITY RECEIVED: 5L  
 QUANTITY INSPECTED: 5L  
 QUANTITY REJECTED: 0

THICKNESS ORDERED: 0.375  
 THICKNESS RECEIVED: 0.375  
 SHEET SIZE ORDERED: —  
 SHEET SIZE RECEIVED: —

DESCRIPTION	NCR (Check Y/N)	COMMENTS
SURFACE DAMAGE	Y <input checked="" type="checkbox"/> N	
CORRECT FINISH	<input checked="" type="checkbox"/> Y N	
CORROSION	Y <input checked="" type="checkbox"/> N	
CORRECT GRAIN DIRECTION	<input checked="" type="checkbox"/> Y N	
CORRECT MATERIAL PER M-DRAWING	<input checked="" type="checkbox"/> Y N	<u>Deion</u>
CORRECT THICKNESS	<input checked="" type="checkbox"/> Y N	
PHOTO REQUIRED	Y <input checked="" type="checkbox"/> N	
CORRECT REF # TO LINK CERT	<input checked="" type="checkbox"/> Y N	<u>P0042020</u>
CORRECT MATERIAL IDENTIFICATION	<input checked="" type="checkbox"/> Y N	
CORRECT M# ON THE MATERIAL	<input checked="" type="checkbox"/> Y N	
DOES THIS MATERIAL REQUIRE ENGINEERING SIGN OFF	Y <input checked="" type="checkbox"/> N	
DOES THIS REQUIRE AN EXTRUSION REPORT	Y <input checked="" type="checkbox"/> N	

CUT SAMPLE PIECE OF MATERIAL AND PERFORM A HARDNESS CHECK. RECORD RESULTS BELOW					
	HRC	HRB	DUR A	DUR D	WEBSTER
TYPE OF MATERIAL					
SIZE OF TEST SAMPLE					
HARDNESS / DUROMETER READING					

testers located in the Quality Office

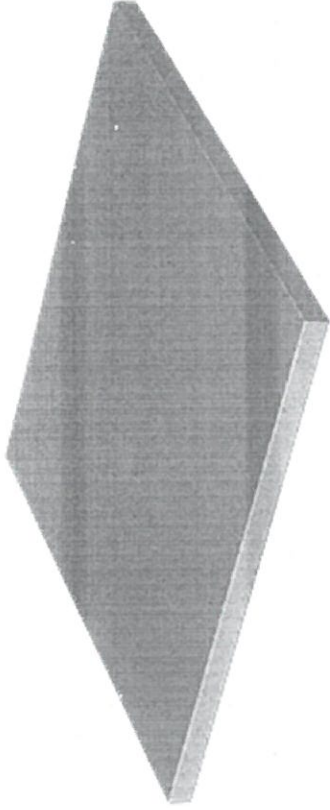
QC 18 INSPECTION	ENGINEERING SIGNOFF (if required)
INSPECTED BY: <u>DAS 61</u> DATE: <u>19/01/07</u>	SIGNED OFF BY: _____ DATE: _____

Attach this inspection sheet with the corresponding material cert and remit to be scanned and received in

# McMASTER-CARR®

## Tight-Tolerance Multipurpose O1 Tool Steel Bar 1/2" Thick, 12" Wide

9516K527



Material	O1 Tool Steel
Cross Section Shape	Rectangle
Construction	Solid
Appearance	Plain
Thickness	1/2"
Thickness Tolerance	-0.001" to 0.001"
Tolerance Rating	Tight
Width	12"
Width Tolerance	0" to 0.015"
Yield Strength	50,000 psi
Temper Rating	Not Rated
Hardness	Rockwell B85
Hardness Rating	Medium
Heat Treatable	Yes
Maximum Hardness after Heat Treatment	Rockwell C65
Mechanical Finish	Precision Ground
Temperature Range	Not Rated
Specifications Met	ASTM A681
Flatness Tolerance	Not Rated
Density	0.28 lbs./cu. in.
Coefficient of Thermal Expansion	$7.1 \times 10^{-6}$
Elongation	25%
Material Composition	
Iron	94.79-96.95%
Carbon	0.85-1.05%
Chromium	0.40-0.70%

Manganese	1.00-1.40%
Nitrogen	0.40-0.60%
Phosphorus	0-0.030%
Silicon	0-0.50%
Sulfur	0-0.030%
Tungsten	0.40-0.60%
Vanadium	0-0.30%
Length	1 1/2 ft., 3 ft., 6 ft.
Additional Specifications	Guidelines for Heat Treating Tool Steel

These precision-ground sheets and bars have a tight thickness tolerance of  $\pm 0.001"$  ( $\pm 0.05$  mm). Commonly used for dies, punches, and gauges, O1 tool steel is an oil-hardening material that resists wear and abrasion. Sheets and bars are also known as flat stock.

**Q** What are the two main types of neurons?

**A** Sensory neurons and motor neurons.

**Q** How do sensory neurons differ from motor neurons?

**A** Sensory neurons carry information from the receptors to the brain, while motor neurons carry information from the brain to the effectors.

**Q** What is the function of interneurons?

**A** Interneurons connect sensory neurons to motor neurons, allowing for complex processing and coordination of movement.

**Q** What is the role of the myelin sheath?

**A** The myelin sheath insulates the axon, preventing the leakage of electrical signals and speeding up the transmission of nerve impulses.

**Q** How does the speed of nerve impulse conduction vary?

**A** The speed of nerve impulse conduction varies depending on the diameter of the axon and the presence or absence of a myelin sheath. Larger axons and those with myelin conduct impulses faster.

**Q** What factors can affect the speed of nerve impulse conduction?

**A** Factors such as temperature, pH, and the presence of certain ions can affect the speed of nerve impulse conduction.

**Q** How do neurotransmitters facilitate communication between neurons?

**A** Neurotransmitters are released by the presynaptic neuron into the synaptic cleft, where they bind to receptors on the postsynaptic neuron, triggering an action potential.

**Q** What are some examples of neurotransmitters?

**A** Examples include acetylcholine, dopamine, serotonin, and gamma-aminobutyric acid (GABA).

**Q** How do neurotransmitters exert their effects on the postsynaptic neuron?

**A** Neurotransmitters bind to specific receptors on the postsynaptic neuron, which opens ion channels and allows ions to flow across the membrane, generating an action potential.

**Q** What is the significance of the resting potential?

**A** The resting potential is the baseline electrical charge across the cell membrane, maintained by the unequal distribution of ions (K<sup>+</sup> and Na<sup>+</sup>) and the permeability of the membrane to these ions.

**Q** How is the resting potential established?

**A** The resting potential is established by the differential permeability of the cell membrane to K<sup>+</sup> and Na<sup>+</sup> ions, with K<sup>+</sup> being more permeable at rest.

**Q** What happens during an action potential?

**A** During an action potential, there is a rapid depolarization of the membrane potential followed by repolarization and hyperpolarization, creating a traveling wave of electrical excitation.

**Q** How does an action potential propagate along the axon?

**A** An action potential propagates along the axon by the sequential opening and closing of voltage-gated ion channels, ensuring the signal travels in one direction.

**Q** What is the all-or-none principle?

**A** The all-or-none principle states that once the threshold for an action potential is reached, it will fire fully; otherwise, no action potential occurs.

**Q** How do action potentials relate to the transmission of information?

**A** Action potentials serve as the primary means of long-distance communication between neurons, carrying encoded information about stimuli and responses.

**Q** What is the relationship between frequency and amplitude in neural signaling?

**A** Frequency refers to the rate at which action potentials occur, while amplitude refers to the magnitude of the change in membrane potential during each action potential. Amplitude is constant, while frequency varies with stimulus intensity.

**Q** How do action potentials ensure reliable transmission of information?

**A** Action potentials ensure reliable transmission through saltatory conduction, where the signal jumps between nodes of Ranvier, minimizing energy loss and maintaining signal strength over distance.

**Q** What is the significance of the refractory period?

**A** The refractory period prevents the immediate re-firing of an action potential, ensuring unidirectional propagation and limiting the maximum firing rate of a neuron.

**Q** How do action potentials contribute to the overall function of the nervous system?

**A** Action potentials are essential for coordinating movement, processing sensory input, and regulating physiological functions throughout the body.

**Q** What are some clinical conditions related to neuronal signaling?

**A** Clinical conditions include multiple sclerosis (demyelination), Parkinson's disease (dopamine deficiency), Alzheimer's disease (neurotransmitter imbalance), and epilepsy (excessive neuronal firing).

**Q** How do neurotoxins affect neuronal signaling?

**A** Neurotoxins can damage neurons, disrupt neurotransmission, and interfere with the generation and propagation of action potentials.

**Q** What are some ways to protect and support neuronal health?

**A** Maintaining a healthy diet, staying hydrated, exercising regularly, and avoiding excessive alcohol consumption and drug use can help protect and support neuronal health.

**Q** How do neuroscientists study neuronal signaling?

**A** Neuroscientists use various techniques, including electrophysiology, imaging, molecular biology, and behavioral experiments, to study neuronal signaling.

**Q** What are some future directions in the study of neuronal signaling?

**A** Future research aims to understand the underlying mechanisms of neurological disorders, develop targeted therapies, and explore the potential of neuroregeneration and neuroprotection strategies.

**Q** How do you think your understanding of neuronal signaling has improved since starting this course?

**A** My understanding has significantly improved, particularly regarding the intricate details of action potential generation, propagation, and the role of neurotransmitters in neural communication.

**Q** What are some key takeaways from this course?

**A** Key takeaways include the fundamental principles of neuronal signaling, the importance of the myelin sheath, the role of neurotransmitters, and the dynamic nature of the resting potential and action potential.

**Q** How do you plan to apply this knowledge in your future studies or career?

**A** I plan to apply this knowledge in my future studies and career by exploring the molecular basis of neurological diseases and investigating potential therapeutic interventions targeting neuronal signaling pathways.

**Q** Are there any additional resources or topics you would like to explore further?

**A** Yes, I would like to explore the topic of neuroplasticity and its implications for learning and memory further.

**Q** Thank you for your participation and contributions today!

**A** Thank you for providing this opportunity to learn and discuss neuronal signaling.

SPECIFICATION:  
DIN 1.2510 or B.S. BO 1 or  
SAE J437 or SAE J438  
or UNS T31501 or ASTM A681

PART NUMBER:  
MT-01-B-1H-1HH1xW.WWWJ  
WHERE "H.H.HH" = HEIGHT IN INCHES  
WHERE "W.WWW" = WIDTH IN INCHES  
EG. 4"x6" BAR = MT-01-B-4.000x6.000

EWING - 108

[illegible]



# MATERIAL RECEIPT INSPECTION FORM

MATERIAL: MT-01-B-0.500x12.000

PO / BATCH NO.: P004200/S/42239

DATE: 19/01/07

MATERIAL CERT REC'D: Yes  
 QUANTITY RECEIVED: 3ft  
 QUANTITY INSPECTED: 3ft  
 QUANTITY REJECTED: 0

THICKNESS ORDERED: 0.500"  
 THICKNESS RECEIVED: 0.500"  
 SHEET SIZE ORDERED: —  
 SHEET SIZE RECEIVED: —

DESCRIPTION	NCR (Check Y/N)	COMMENTS
SURFACE DAMAGE	Y <input checked="" type="checkbox"/>	
CORRECT FINISH	<input checked="" type="checkbox"/> N	
CORROSION	Y <input checked="" type="checkbox"/>	
CORRECT GRAIN DIRECTION	<input checked="" type="checkbox"/> N	
CORRECT MATERIAL PER M-DRAWING	<input checked="" type="checkbox"/> N	<u>ASTM A681</u>
CORRECT THICKNESS	<input checked="" type="checkbox"/> N	
PHOTO REQUIRED	Y <input checked="" type="checkbox"/>	
CORRECT REF # TO LINK CERT	<input checked="" type="checkbox"/> N	<u>P0042020</u>
CORRECT MATERIAL IDENTIFICATION	<input checked="" type="checkbox"/> N	
CORRECT M# ON THE MATERIAL	<input checked="" type="checkbox"/> N	
DOES THIS MATERIAL REQUIRE ENGINEERING SIGN OFF	Y <input checked="" type="checkbox"/>	
DOES THIS REQUIRE AN EXTRUSION REPORT	Y <input checked="" type="checkbox"/>	

CUT SAMPLE PIECE OF MATERIAL AND PREFORM A HARDNESS CHECK. RECORD RESULTS BELOW					
	HRC	HRB	DUR A	DUR D	WEBSTER
TYPE OF MATERIAL					
SIZE OF TEST SAMPLE					
HARDNESS / DUROMETER READING					

testers located in the Quality Office

QC 18 INSPECTION	ENGINEERING SIGNOFF (if required)
INSPECTED BY: <u>DAS 61</u> DATE: <u>19/01/07</u>	SIGNED OFF BY: _____ DATE: _____

Attach this inspection sheet with the corresponding material cert and remit to be scanned and received in

Tight-Tolerance Multipurpose O1 Tool Steel Rod  
0.3750" Diameter

8893K239



Material	O1 Tool Steel
Cross Section Shape	Round
Construction	Solid
Appearance	Plain
Diameter	0.375"
Diameter Tolerance	-0.0005" to 0.0005"
Tolerance Rating	Tight
Yield Strength	50,000 psi
Temper Rating	Softened (Annealed)
Hardness	Rockwell B90
Hardness Rating	Medium
Heat Treatable	Yes
Maximum Hardness after Heat Treatment	Rockwell C65
Mechanical Finish	Precision Ground
Temperature Range	Not Rated
Specifications Met	ASTM A681
Straightness Tolerance	Not Rated
Density	0.28 lbs./cu. in.
Coefficient of Thermal Expansion	$7.1 \times 10^{-6}$
Elongation	25%
Material Composition	
Iron	94.79-96.95%
Carbon	0.85-1.05%
Chromium	0.40-0.70%
Manganese	1.00-1.40%
Nitrogen	0.40-0.60%

Phosphorus	0-0.030%
Silicon	0-0.50%
Sulfur	0-0.030%
Tungsten	0.40-0.60%
Vanadium	0-0.30%
Length	3 ft., 6 ft.
Additional Specifications	Guidelines for Heat Treating Tool Steel
RoHS	Compliant

These precision-ground rods have a tight diameter tolerance. Commonly used for dies, punches, and gauges, O1 tool steel is an oil-hardening material that resists wear and abrasion.

## SPECIFICATION CONTROL DRAWING

PURCHASE MATERIAL : AISI O1 TOOL STEEL ROUND BAR  
SPECIFICATION: DIN 1.2510 or B.S. BO 1 or  
SAE J437 or SAE J438  
or UNS T31501 or ASTM A681  
PART NUMBER: MT-O1-R [D.DDD]  
WHERE "D.DDD" = DIAMETER IN INCHES  
EG. 5/8" ROUND BAR = MT-O1-R0.625

REV.	DESCRIPTION	DATE	BY	APPROVED
A	NEW ISSUE	17.08.09	VM	VM

<b>DART</b> AEROSPACE		Manufacturing Division, Canada	
AISI O1 TOOL STEEL ROUND BAR			
DESIGN BY:	VM 08/09/2017	MT-O1-R	REV A
CHECKED:	SAC 08/31/2017		
MYO APPE:	DP 08/05/2017		
QA APPE:	PD 08/17/2017		
APPROVED:	VM 09/12/2017		
DATE:	8/31/2017	SCALE:	N/S
COPYRIGHT © 2017 BY DART AEROSPACE LTD.			

# MATERIAL RECEIPT INSPECTION FORM

MATERIAL: M7-01-R0.375

PO / BATCH NO.: P0042020/S142240

DATE: 19/01/07

MATERIAL CERT REC'D: Yes

THICKNESS ORDERED: 0.375"

QUANTITY RECEIVED: 684

THICKNESS RECEIVED: 0.375"

QUANTITY INSPECTED: 614

SHEET SIZE ORDERED: —

QUANTITY REJECTED: 0

SHEET SIZE RECEIVED: —

DESCRIPTION	NCR (Check Y/N)	COMMENTS
SURFACE DAMAGE	Y <input checked="" type="checkbox"/> N	
CORRECT FINISH	<input checked="" type="checkbox"/> Y <input checked="" type="checkbox"/> N	
CORROSION	Y <input checked="" type="checkbox"/> N	
CORRECT GRAIN DIRECTION	<input checked="" type="checkbox"/> Y <input checked="" type="checkbox"/> N	
CORRECT MATERIAL PER M-DRAWING	<input checked="" type="checkbox"/> Y <input checked="" type="checkbox"/> N	<u>ASTM A681</u>
CORRECT THICKNESS	<input checked="" type="checkbox"/> Y <input checked="" type="checkbox"/> N	
PHOTO REQUIRED	Y <input checked="" type="checkbox"/> N	
CORRECT REF # TO LINK CERT	<input checked="" type="checkbox"/> Y <input checked="" type="checkbox"/> N	<u>P0042020</u>
CORRECT MATERIAL IDENTIFICATION	<input checked="" type="checkbox"/> Y <input checked="" type="checkbox"/> N	
CORRECT M# ON THE MATERIAL	<input checked="" type="checkbox"/> Y <input checked="" type="checkbox"/> N	
DOES THIS MATERIAL REQUIRE ENGINEERING SIGN OFF	Y <input checked="" type="checkbox"/> N	
DOES THIS REQUIRE AN EXTRUSION REPORT	Y <input checked="" type="checkbox"/> N	

CUT SAMPLE PIECE OF MATERIAL AND PREFORM A HARDNESS CHECK. RECORD RESULTS BELOW					
	HRC	HRB	DUR A	DUR D	WEBSTER
TYPE OF MATERIAL					
SIZE OF TEST SAMPLE					
HARDNESS / DUROMETER READING					

testers located in the Quality Office

QC 18 INSPECTION	ENGINEERING SIGNOFF (if required)
INSPECTED BY: <u>DAS 61</u> DATE: <u>19/01/07</u>	SIGNED OFF BY: _____ DATE: _____

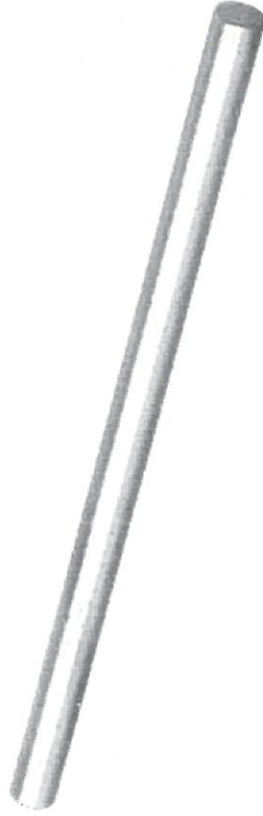
Attach this inspection sheet with the corresponding material cert and remit to be scanned and received in



# McMASTER-CARR®

## Tight-Tolerance Multipurpose O1 Tool Steel Rod 0.6250" Diameter

8893K9



Material	O1 Tool Steel
Cross Section Shape	Round
Construction	Solid
Appearance	Plain
Diameter	0.625"
Diameter Tolerance	-0.001" to 0.001"
Tolerance Rating	Tight
Yield Strength	50,000 psi
Temper Rating	Softened (Annealed)
Hardness	Rockwell B90
Hardness Rating	Medium
Heat Treatable	Yes
Maximum Hardness after Heat Treatment	Rockwell C65
Mechanical Finish	Precision Ground
Temperature Range	Not Rated
Specifications Met	ASTM A681
Straightness Tolerance	Not Rated
Density	0.28 lbs./cu. in.
Coefficient of Thermal Expansion	$7.1 \times 10^{-6}$
Elongation	25%
Material Composition	
Iron	94.79-96.95%
Carbon	0.85-1.05%
Chromium	0.40-0.70%
Manganese	1.00-1.40%
Nitrogen	0.40-0.60%



Phosphorus	0-0.030%
Silicon	0-0.50%
Sulfur	0-0.030%
Tungsten	0.40-0.60%
Vanadium	0-0.30%
Length	1 ft., 3 ft., 6 ft.
Additional Specifications	Guidelines for Heat Treating Tool Steel
RoHS	Compliant

These precision-ground rods have a tight diameter tolerance. Commonly used for dies, punches, and gauges, O1 tool steel is an oil-hardening material that resists wear and abrasion.

## SPECIFICATION CONTROL DRAWING

PURCHASE MATERIAL : AISI O1 TOOL STEEL ROUND BAR  
SPECIFICATION: DIN 1.2510 or B.S. BO 1 or  
SAE J437 or SAE J438  
or UNS T31501 or ASTM A681  
PART NUMBER: MT-O1-R [D.DDD]  
WHERE "D.DDD" = DIAMETER IN INCHES  
EG. 5/8" ROUND BAR = MT-O1-R0.625

REV.	DESCRIPTION	DATE	BY	APPROVED
A	NEW ISSUE	17.08.09	VM	WM

<b>DART</b> AEROSPACE		DESIGN BY: VM 08/31/2017		DATE: 17.08.09	BY: VM	APPROVED: WM
AISI O1 TOOL STEEL ROUND BAR		CHECKED: SAC 08/31/2017				
Dwg No. MT-O1-R		MFG APPR: DP 08/31/2017				
		DATE: 08/31/2017				
		APPROVED: VM 08/31/2017				
		DATE: 08/31/2017				
		SHEET 1 OF 1				
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UN17-00

# MATERIAL RECEIPT INSPECTION FORM

MATERIAL: MT-01-RD-625

PO / BATCH NO.: P0042020/5142241

DATE: 19/01/07

MATERIAL CERT REC'D: Yes

THICKNESS ORDERED: 0.625"

QUANTITY RECEIVED: 64

THICKNESS RECEIVED: 0.625"

QUANTITY INSPECTED: 64

SHEET SIZE ORDERED: —

QUANTITY REJECTED: 0

SHEET SIZE RECEIVED: —

DESCRIPTION	NCR (Check Y/N)	COMMENTS
SURFACE DAMAGE	Y (N)	
CORRECT FINISH	(Y) N	
CORROSION	Y (N)	
CORRECT GRAIN DIRECTION	(Y) N	
CORRECT MATERIAL PER M-DRAWING	(Y) (N)	ASTM A681
CORRECT THICKNESS	(Y) N	
PHOTO REQUIRED	Y (N)	
CORRECT REF # TO LINK CERT	(Y) N	P0042020
CORRECT MATERIAL IDENTIFICATION	(Y) N	
CORRECT M# ON THE MATERIAL	(Y) N	
DOES THIS MATERIAL REQUIRE ENGINEERING SIGN OFF	Y (N)	
DOES THIS REQUIRE AN EXTRUSION REPORT	Y (N)	

CUT SAMPLE PIECE OF MATERIAL AND PREFORM A HARDNESS CHECK. RECORD RESULTS BELOW					
	HRC	HRB	DUR A	DUR D	WEBSTER
TYPE OF MATERIAL					
SIZE OF TEST SAMPLE					
HARDNESS / DUROMETER READING					

*testers located in the Quality Office*

QC 18 INSPECTION	ENGINEERING SIGNOFF (if required)
INSPECTED BY: <u>BAS 61 9-89</u> DATE: <u>19/01/07</u>	SIGNED OFF BY: _____ DATE: _____

Attach this inspection sheet with the corresponding material cert and remit to be scanned and received in